Reappraisal of *Scaevola oldfieldii* (Goodeniaceae) and recognition of a new species *S. kallophylla* from south-west Western Australia

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Abstract

G.J. Howell. Reappraisal of *Scaevola oldfieldii* (Goodeniaceae) and recognition of a new species *S. kallophylla* from south-west Western Australia. Nuytsia 11 (1): 25-31 (1996). Recent collection and cultivation of the two rare taxa included in *Scaevola oldfieldii sens. lat.*, showed that they are distinct species; *S. oldfieldii* F. Muell., a glabrous-leaved shrub to 2.3 m found on rocky slopes between the Murchison River and Geraldton; and *S. kallophylla* G.J. Howell *sp. nov.*, a pubescent, leafier shrub to 0.8 m on the sandy coastal plain between the Murchison and Greenough Rivers. The taxonomy is discussed and an additional couplet, amending the *Scaevola* L. key in the "Flora of Australia", is given to accommodate the new species. Both species are illustrated.

Introduction

Since last century taxonomists have been aware that two taxa were included in *Scaevola oldfieldii* but have chosen not to elevate them above varietal level (Mueller 1860; Diels & Pritzel 1905). Unfortunately, neither of these variants was extensively collected and when Carolin began his monograph for the "Flora of Australia" project (see Carolin 1990), the types had either been destroyed or were unassigned and the species was listed as extinct (Briggs & Leigh 1988).

Expeditions, conducted by myself and the Royal Botanic Gardens, to the Irwin Botanical District of Western Australia in 1991 and 1992, located two variants of *S. oldfieldii.* Cuttings of both variants were propagated at the Royal Botanic Gardens, South Yarra, and have retained their appearance after four years in cultivation. Subsequent examination of the herbarium and living specimens showed that the currently accepted concept of *S. oldfieldii* encompasses two species.

Taxonomic treatment

Mueller's (1860) original description of *Scaevola oldfieldii* mentions two varieties: *leiophylla* (leaves smooth) and *sericophylla* (leaves with silky hairs), but the remark did not constitute a formal description. Diels & Pritzel (1905) described a hairy variant as *S. oldfieldii* var. *tomentosa* E. Pritzel but the holotype has since been destroyed (Carolin 1990). Apparent similarity, rarity, infrequent

collection and the lack of provenance, soil and community information on older herbarium specimens led Carolin (1990) to synonymize this variety.

Carolin (1990) nominated a glabrous specimen (MEL 1521413) as the lectotype of *S. oldfieldii*. The lectotype and isolectotype (MEL 588152), originally from Mueller's herbarium, are glabrous plants from the Murchison River. Two other glabrous specimens from Mueller's herbarium (MEL 1521412, 1521413) have the varietal epithet '*leiophylla*' annotated on their original labels.

Herbarium specimens of the smooth and hairy variants appear remarkably similar and the taxa are more easily distinguished in the living state by the growth habit, flowers, leaf base and indumentum. The present study indicates that the two taxa separate on significant morphological differences and habitat preference and thus each warrants specific designation.

The hairy variant described here as *S. kallophylla* G.J. Howell *sp. nov.* may be synonymous with *S. oldfieldii* var. *tomentosa* but this cannot be tested in the absence of its type material. In any case the epithet, '*tomentosa*' cannot be used as *S. tomentosa* Gaudich. is a validly described and distinct species (Chapman 1991, Carolin 1992).

A major difficulty in using the keys to *Scaevola* species is their reliance on fruit characters. Since fruits of *S. kallophylla* have not been seen by the author, it was assumed that they are similar to those of *S. oldfieldii*. The *Scaevola* species key in the "Flora of Australia" (Carolin 1992) should be altered to read from couplet 14 in Group 3:

14 Flowers mostly in lateral spikes shorter than the leaves or solitary in the axils

14a Shrub to 2.3 m; stem glabrous; leaves petiolate without dense silky hairs in the axils; bracteoles > 3/4 length of corolla; flowers 11-21 mm long ..... **S. oldfieldii**

14a: Shrub to 0.8 m; stem with a fine indumentum; leaves sessile with dense silky hairs in the axils; bracteoles < 1/2 length of corolla; flowers 16-36 mm long ..... **S. kallophylla**

14: Flowers in terminal spikes mostly longer than the leaves

Scaevola oldfieldii F. Muell., Fragm. 2: 19 (1860) - *Lobelia oldfieldii* (F. Muell.) Kuntze, Revis. Gen. Pl. 2: 378 (1891). *Type:* Murchison River, [Western Australia], *A. Oldfield* (*lecto:* MEL 1521413; *isolecto:* MEL 1521412, MEL 588153). (Figure 1)

Shrub to 2.3 m high, older plants with the leaves frequently restricted to the branch tips. *Stems* glabrous. *Leaves* glabrous, acuminate, entire or distantly and sharply dentate, lanceolate to oblanceolate with the base attenuate-petiolate, 75.7-92.3 x 12.1-19.7 mm, axils with few or no hairs, veins camptodromous. *Flowers* sessile, white, streaked with maroon along veins, 11-21 mm long, 10-15 mm wide, borne in leaf axils singly or crowded onto short spikes *c.* 30 mm long rarely to 80 mm. *Bracteoles* > 3/4 length of corolla, pugioniform. *Corolla wings* frequently plicate or incompletely developed to 2.2 mm across, margin ragged. *Floral trichomes* - in corolla throat plumose; on style simple, pilose. *Indusium* 1.4-2.1 mm wide. *Ovary* doliform-turbinate, naked, 1-locular with two ovules. *Fruit* doliform-obovate 3.2 x 1.4 mm, rugulose (tuberculate according to Carolin 1992).

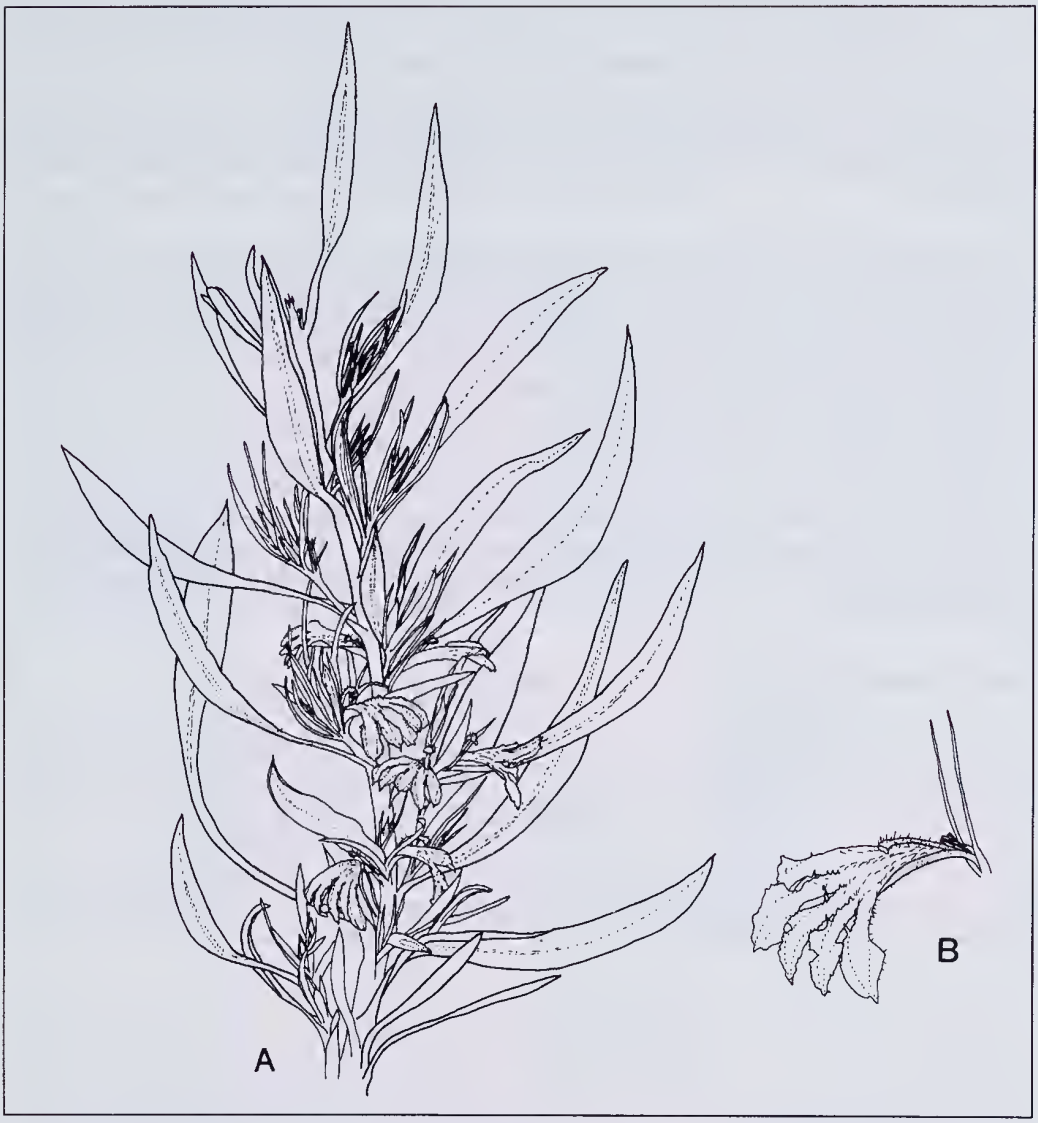

Figure 1. *Scaevola oldfieldii* A - flowering branch (x 0.7), B - flower (x1.3). Based on photographs taken of the 'Z-Bend' population (Kalbarri National Park, September 1991).

Other specimens examined. WESTERN AUSTRALIA: 12 miles [19.3 km] N of Northampton on North West Coastal Highway, 2 Sep. 1970, *A.S. George* 10731 (PERTH); Clay flats Hutt River, 11 Nov. 1972, *B.M.S. Hussey* (PERTH); 28°56'S, 115°09'E, 4.8 km W of Casuarina, 5 Dec. 1976, *R.J. Hnatiuk* 760336a (PERTH); 15.7 km W along fire track towards 'Z-bend' from eastern boundary to E side of Murchison River, Kalbarri National Park, 27°38'10"S, 114°30'10"E, Sep. 1991 *W.P.A. Worboyce* 671 (MEL); 27.6 km S of Northampton grain silo complex along North West Coastal Highway = 14.8 km N of Nabawa turn-off on edge of Geraldton, Sep. 1991, *W.P.A. Worboyce* 798 (MEL); West end of fire break to back of 'Z-bend', upper slopes of Murchison River, Kalbarri National Park, 28 Sep. 1991, *D.R. & B. Bellairs* 1452A (PERTH).

Distribution. From the Murchison River, south to Geraldton, Western Australia.

Habitat. Rocky slopes in mixed shrubland growing on shallow sandy soils.

Flowering period. In the field flowering occurs from August to December but this is apparently water-limited as the species continues to flower into April when grown under shade-house conditions in Melbourne.

Conservation status. Conserved within Kalbarri National Park but outside the park the species is vulnerable due to its small, patchy distribution. Briggs and Leigh (1988) gave this species a conservation code of 2X, but 3RC is considered to be more appropriate. A single genotype (*W.P.A. Worbyce* 671) has been propagated at the Royal Botanic Gardens, South Yarra (MRBG941568). CALM Conservation Codes for Western Australian Flora: Priority 3.

Etymology. Named in honour of A. Oldfield.

Affinities. Similar to *S. kallophylla*, especially as a herbarium specimen, but can be distinguished by its glabrous stems and petiolate leaves. Strongly resembles some erect variants of *S. repens* but is much taller. Hybrid progeny were created using *S. oldfieldii* pollen and a *S. repens* female parent (Howell unpublished data).

Scaevola kallophylla G.J. Howell, *sp. nov.* (Figure 2)

A *Scaevola oldfieldii* differt foliis sessilibus, oblanceolatus, fere mucronatis, breviter pubescentibus at cum pilis longis sericeis confertis in axillis; habitat non nisi inter flumina Murchison et Greenough, in campis maritimus arenosis neque in clivis rupestribus.

Typus: 27°46'S, 114°08'E, Kalbarri Airport turn-off, 3 km from Red Bluff on coastal road to Port Gregory, Kalbarri National Park, Western Australia, 31 October 1992, *G.J. Howell* 158 (*holo:* MEL 2028791; *iso:* MELU, PERTH).

Shrub to 0.8 m high, with terminal foliage appearing particularly dense due to the shorter internodes at the branch tips. *Stems* hairy, pubescent when young . *Leaves* almost hoary due to minute moniliform hairs (not easily discerned in herbarium specimens), almost mucronate, entire, though basal leaves may be remotely dentate, oblanceolate to obovate, 70.9-117.0 x 14.3-25.1 mm, sessile, with silky hairs in the axils sometimes extending onto the leaf-base, veins camptodromous. *Flowers* sessile, white, streaked with maroon along veins, 16-36 mm long, 20-35 mm wide, borne singly in leaf axils or on spicate lateral branches to 120 mm. *Bracteoles* < 1/2 length of corolla, lanceolate, 10-18 x 1.9-4.6 mm. *Corolla wings* flat, entire, 2.3-4.4 mm wide. *Floral trichomes* - in corolla throat simple; on style simple, villous. *Indusium* 2.4-3.1 mm wide. *Ovary* fusiform, naked, 1-locular with two ovules. *Fruit* not seen.

Other specimens examined. WESTERN AUSTRALIA: Champion Bay, 1877, F. Mueller? (MEL 15211416); Greenough River, Nov. 1877, unknown collector (MEL 1521414); Greenough River, Nov. 1877, unknown collector (MEL 1521415); 31 Aug. 1960, *Burns* 1029 (PERTH); 27°46'S, 114°08'E, Kalbarri Airport turn-off, 3 km from Red Bluff on coastal road to Port Gregory, Kalbarri National Park, 31 Oct. 1992, *G.J. Howell* 160 (MEL); 27°48'53"S, 114°08'19"E, 10 km south of Red Bluff, 25 May 1994, *R.J. Cranfield* 9230 (PERTH); 27°48'53"S, 114°08'19"E, south of Red Bluff,

Kalbarri National Park, 25 May 1994, *R.J. Cranfield* 9231 (PERTH); 27°51'53"S, 114°09'02"E, south-west edge of Kalbarri National Park, 29 Dec. 1994, *R.J. Cranfield* 9404 (PERTH).

Distribution. Coastal plain between the Murchison and Greenough Rivers, Western Australia.

Habitat. Coastal heath communities growing on light sandy soils. Vigorous recruitment noted amongst post-fire regenerating *Banksia* or *Acacia* shrubland/heath.

Flowering period. In the field flowering occurs from August to December but this is apparently water-limited as the species continues to flower into March when grown under shade-house conditions in Melbourne.

Conservation status. Conserved within Kalbarri National Park. Large numbers of plants were sighted on the coastal road to Port Gregory for *c.* 20 km south of the Kalbarri Airport. Briggs & Leigh (1988) do not distinguish between this species and *S. oldfieldii*, which is given the code 2X, however, a designation of 3RCa is considered to be more suitable. Two genotypes have been propagated at the Royal Botanic Gardens, South Yarra (*G.J.Howell* 158 = MRBG 941568, *G.J.Howell* 160 = MRBG 941563). CALM Conservation Codes for Western Australian Flora: Priority 4.

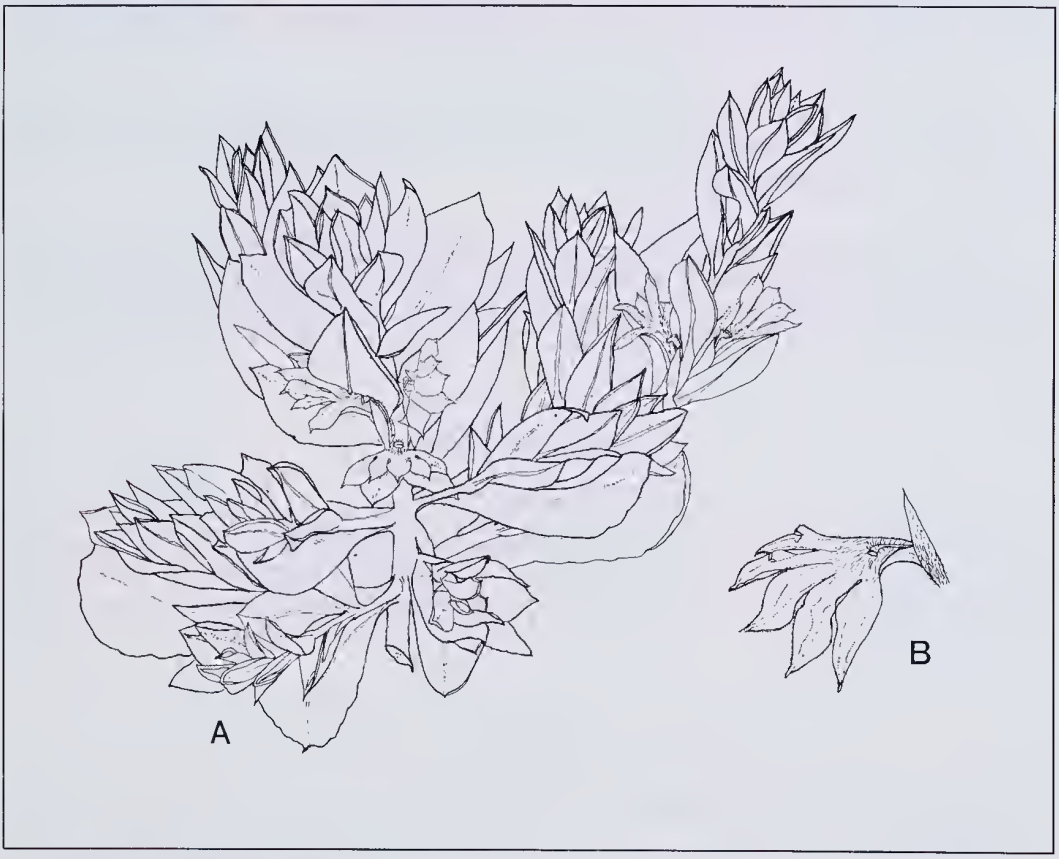

Figure 2. *Scaevola kallophylla* A - flowering branch (x 0.4), B - flower (x 0.8). Based on photographs taken of the 'Kalbarri Airport' population (Kalbarri National Park, October 1992).

Etymology. The specific epithet is derived from the Greek *kallos* - beautiful, and *phyllon* - leaf, alluding to its attractive foliage which resembles that of some *Callistemon* species.

Affinities. Similar to *S. oldfieldii,* especially as a herbarium specimen, but can be distinguished by the indumentum; the broader, sessile leaves and the longer inflorescences. Slight resemblance to *S. porocarya* but is more robust, the flowers are never in weak terminal spikes and are white rather than blue.

Discussion

In general the leaves of *Scaevola kallophylla* are much wider than those of *S. oldfieldii,* however, as a distinguishing feature the use of leaf size and shape alone may be misleading due to the gradation of vegetative leaves into the floral bracts in *S. kallophylla.* Fresh leaves of *S. kallophylla* can be easily distinguished by the presence of moniliform hairs but floral characters should also be considered when attempting to differentiate these species.

Scaevola kallophylla is probably a member of sect. *Xerocarpa* but confirmation can not be made in the absence of fruit. Little nectar was observed in *S. kallophylla* flowers either in the field or on plants grown in the glass house. An unidentified winged, Hymenopteran was observed to persistently enter flowers on plants at the Kalbarri Airport turn-off.

Scaevola kallophylla is an attractive plant which may have horticultural value though, unlike *S. oldfieldii*, it becomes decumbent when kept in pots for too long. In the glasshouse it is susceptible to attack by white fly and mealy bug.

The northern sand-plains of the Irwin Botanical District, in Western Australia, rank amongst the most floristically diverse regions in Australia, especially for *Scaevola* species (Carolin 1992). While such diversity may detract from the report of a new *Scaevola* in the region, the continued discovery of new species exemplifies the importance of this region to Australia's uncharted biodiversity.

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References

Briggs, B.J.& Leigh, J.H. (1988). (Revised edition). "Rare or Threatened Australian Plants." (Austral. Govt Publishing Service: Canberra.)

Carolin, R.C. (1990). Nomenclatural notes, new taxa and the systematic arrangement in the genus *Scaevola* (Goodeniaceae) including synonyms. Telopea 3: 477-515.

Carolin, R.C. (1992). *Scaevola. In:* "Flora of Australia." Vol. 35. pp. 84-146. (Austral. Govt Publishing Service: Canberra.)

Chapman, A.D. (1991). "Australian Plant Name Index." Vol. 4. (Australian Flora and Fauna Series 15) (Austral. Govt Publishing Service: Canberra.)

Diels, F.L.E. & Pritzel, E. (1905). *Scaevola Oldfieldii. In:* Engler, A. (ed.) "Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie." Vol. 35. p. 571.

Mueller, F. (1860). *Scaevola Oldfieldii. In:* "Fragmenta Phytogeographiae Australiae Occidentalis." Vol. 2. p. 19. (J. Ferres: Melbourne.)